

Investing in IT portfolio management

- Growth path to value management –

Bert Kersten and Han Verniers¹

Prof. dr. H.M.P. Kersten
LogicaCMG Financial Services
The Netherlands
P.O. Box 133
1180 AC Amstelveen
The Netherlands
Bert.Kersten@logicacmg.com
hkersten@cs.vu.nl
tel: +31 20 503 3000

¹ The authors wish to thank Mr. Paul Rayner of LogicaCMG for his valuable comments on an earlier draft. Bert Kersten is professor at the Faculty of Exact Sciences at the Free University Amsterdam. Both Bert Kersten and Han Verniers are principle consultants at LogicaCMG Financial Services, The Netherlands.

Investing in IT portfolio management

- Growth path to value management –

Abstract

Portfolio management has gained a high position on the agenda of executives in organisations. Especially on IT portfolio management clear steps are taken. The focus domains and the areas in which it is applied, have a large overlap with programme management and project management. In this article we give a general overview of the actual state of the art of IT portfolio management and the practical application on IT-activities, projects and programmes. The role in decision making is discussed and practical examples are given. The general theory is described, in brief, for non-experts and the transfer to the domain of IT is studied. Indeed, practical benefits can be obtained but there are also theoretical hurdles. IT portfolio management gives good contributions to project managers, programme managers and decision makers in putting their money and energy on the right issues.

Keywords: IT portfolio management, IT investment management, programme management, project management, selection of project portfolios

Introduction

Research has been going on for a number of years at the Free University Amsterdam (FUA)² and at LogicaCMG on the impact of modern portfolio theory on IT portfolios. An IT portfolio is the whole collection of IT activities within a company or organisation, ranging from hardware and telecom, to software and (business development) projects. The IT portfolios of a number of large financial institutions have been examined at the FUA and a number of pilots have been carried out at other companies by LogicaCMG Financial Services. Concrete improvements have been made in the portfolios, including the detection of very high risk projects that allowed additional measures to be taken, the identification of duplications in projects that could then be eliminated and projects that produced little or nothing economically and could be stopped. The business benefits can be summarized as “more business value for IT” indicating that redundancy was found, out-of-date systems and processes, and unwise risk/return ratios. Further research has been conducted on the curtailment or extension of projects. It can be shown how much this curtailment or delay will cost or produce (Verhoef, 2002). These results show that one of the important benefits of a portfolio approach for IT is the transparency that comes with it.

Since the Clinger-Cohen Act became effective force in the United States, IT portfolio management has risen to the top of the agenda for both IT managers and business managers. This Clinger-Cohen Act states, in brief, that managers within the American government must, when making investments in IT, adopt a portfolio approach in the same way as asset managers and fund managers when investing in the financial markets.

The advantage of this portfolio approach is that the planned investment is considered in the context of the full range of the current (and future) portfolio. At the same time, with a portfolio approach, a balanced business case in itself is no longer a sufficient justification

² FUA is one of the leading universities in The Netherlands, located in Amsterdam. LogicaCMG is a large UK-

for decision making on the investments. Furthermore, - some consider this the most important benefit - the IT activities are made transparent: the full cost and the specific benefits of each IT project can be assessed and discussed and unprofitable projects cancelled as a result. This latter aspect is raised in particular by a number of board members of very large multinationals (such as Philips, Shell, ING and ABN AMRO Bank).

An interesting aspect of a portfolio approach according to the Clinger-Cohen Act is that IT is treated as an *asset*, something that is of value – and has value – within the organisation. IT managers therefore all at once become asset managers. The organisation is faced with the challenge of obtaining optimum return from the IT portfolio, keeping coherence and risk in mind. No longer does IT stand for costs only (Kersten & Verniers, 2004). A characteristic of a portfolio approach is that we are primarily interested in the balance between (expected) risk and (expected) return. Payback period and capital investment are components of the approach. At the same time, we want to know whether that the portfolio is in balance as far as technology, distribution, alignment with our overall business strategy and markets are concerned.

IT portfolio management

The broad arena of quantitative and financial IT portfolio management actually consists of four, partly overlapping, fields of activity:

- The first field is *IT performance management*, which is concerned with the appraisal of operational IT. Subsectors are IT dashboard, benchmarks, market conformity and SLAs.

Without insight into current performance (including costs and revenues) quantitative IT portfolio management is impossible.

- The second field is *IT portfolio management*, in which Markowitz-type models (see Markowitz, 1952) are used for IT to see whether the IT-portfolio is in balance regarding risk and return. Further IT portfolio appraisal models and payback models are applied.
- *IT investment management* is the third field; in this case we use an investment approach for Return on Investment, Net Present Value, contribution to profit or substitution effects.
- The last field of quantitative and financial IT portfolio management is *IT due diligence*, in which the quantification and realisation of synergy returns in mergers and takeovers takes centre stage, as does the reduction of the *time-to-harvest* the benefits of the merger or takeover, the predictability and risk reduction of the IT integration and the lowering of the *morning-after costs*. (Kersten & Evans, 2003).

We distinguish five different kinds of IT portfolios: hardware portfolios, software portfolios, project portfolios, service portfolios and product portfolios.

- The hardware portfolios contain all the hardware, infrastructure and their interconnections. When there is no information about the interconnections available, we can simply talk of an inventory account or investment account.
- Software portfolios are usually the greatest concern where both flexibility and capital investment are concerned. Apart from the software itself, their interaction is very important. Too infrequently are we faced in daily practice with loosely coupled systems that make the removal of parts of the portfolio easy: we are mostly confronted with systems that are highly interwoven with one another. Unravelling is the first step to take in attempting to optimise the software portfolio.

- Service portfolios seem reasonably easy to get for IT departments: they relate to the operating and management activities of the departments. The Service Level Agreements (SLAs) often give sufficient input for this. Practice however is intractable, mainly because it is always a matter of a whole chain of services or components and shared functions or *resource sharing* (infrastructural services) are widely used.
- Project and product portfolios are the simplest portfolios. Techniques from the financial markets can be applied here (especially Markowitz's Modern Portfolio Theory) and in a concrete case the product portfolio of an IT company has been optimised in this way (Kersten & Ozdemir, 2004). However, the statistical and other assumptions need to be given good attention.

Modern Portfolio Theory

Modern Portfolio Theory (MPT) originated with financial asset managers and fund managers. MPT is based on an investment approach that investors use in an effort to control the expected risk and expected return of their investments. One of its essential parts is the quantification of the risk/return ratio in which account is taken of the interaction between different investments. The fundamental purpose of MPT is to determine the optimum allocation of the investments amongst the various investment options.

When we consider the development of a certain investment at the stock market in a given period, we have the fluctuation in the price of the investment (volatility) on the one hand and its return on the other. These two quantities determine the position of the investment in figure 1. The volatility (which in MPT is the variable that indicates the risk) is represented

by the standard deviation of the price. This is plotted on the X-axis. The expected return is shown on the vertical axis. It is obvious that any investment can be visualised in such a figure. It must also be noted that of course many more risks come into play as well; simply by using the volatility, we are ignoring other risk sources. On the other hand other risks are difficult to quantify.

According to MPT, when we want to construct an optimal portfolio of financial investments, we ask ourselves a number of questions:

- which components should the portfolio have to achieve a good risk/return ratio?
- Which stocks and shares? And how many of them?

The answer to this question is very much determined by the correlation between the investments. According to Markowitz there is a boundary line, called the *efficient frontier*, that presents the best possible ratios between return and risk. This line is also shown in figure 1. The points on this efficient frontier represent the maximum return of the portfolio, for a given risk. At the same time we can see how large the minimum risk is for a chosen level of return. Each point on the efficient frontier corresponds to an optimum portfolio with an associated combination of investments.

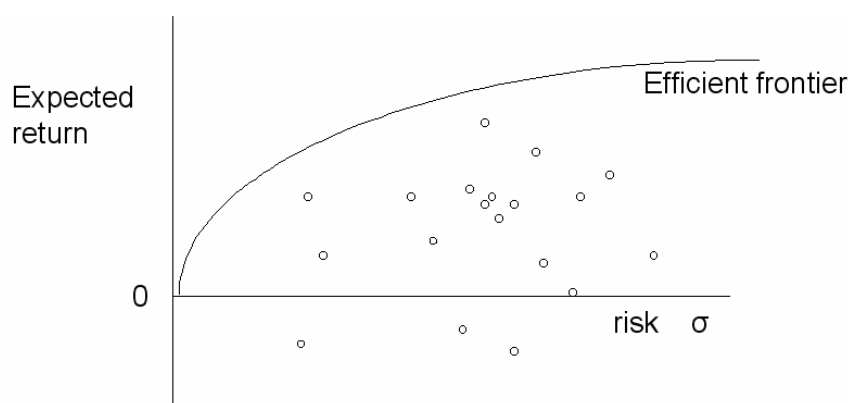


Figure 1. The risk and expected return of a number of investments, including the *efficient frontier*

We can also show the current portfolio graphically, see figure 2. The portfolio manager will want to try to make the result of his portfolio as good as possible, in terms of return and risk. On the one hand he can try, on the basis of the current risk, to improve the return of the portfolio: he will then look at the composition of the optimum portfolio at the same risk level and change the ratios in the current portfolio so that it resembles the optimum portfolio more closely.

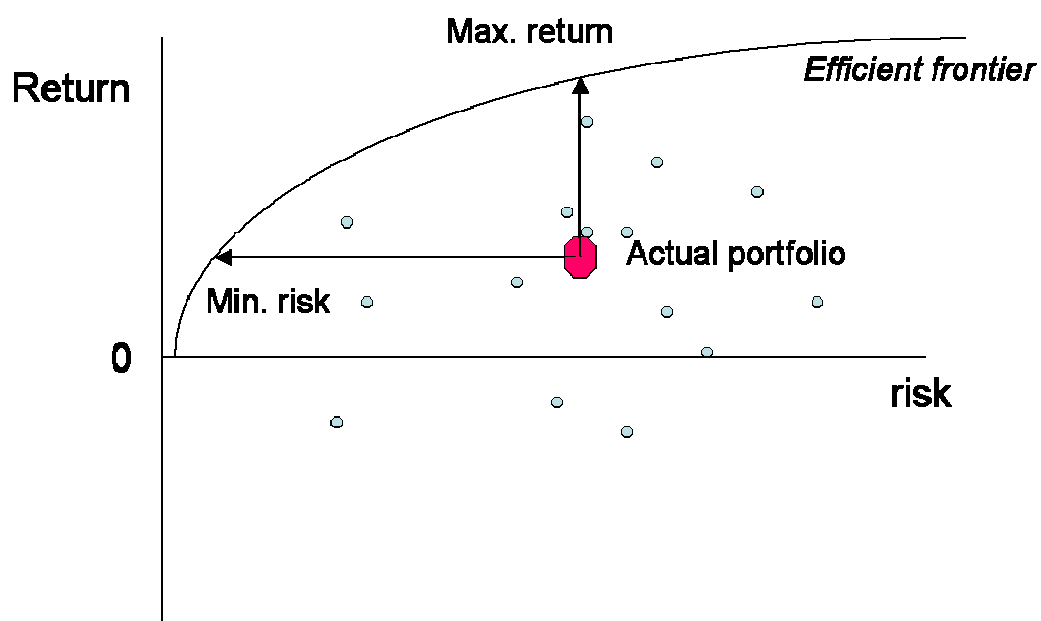


Figure 2. Ways to improve the actual portfolio towards better risk/return ratios

One of the assumptions in the theory and the application of MPT is the trade ability of the investments at the marketplace that the current portfolio can be modified. There is also the issue of return and risk: these have been calculated in a given historical period of time, future returns and risks are unknown and they are approximated by their historical realisations.

IT domain

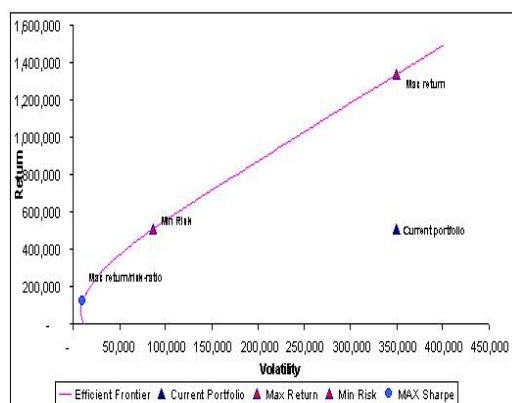
A transfer of MPT to the IT domain recognises that It is a production factor, and must be subject to proper business management, and by the phenomenon that many IT activities are also characterised by a risk factor. This risk factor is sometimes expressed as an ordinal variable (low, medium, high) and sometimes a continuous variable. Sometimes turnover data are available, (where, for example, the IT activities are paid for by the customer) and deducting the costs from this turnover gives the financial return of the activities. Both the risk and the return are then available.

The concept of 'risk' in MPT is far more complicated in an IT context. Risks in IT range from simply 'monthly revenue' to non-performance risk, continuity risk, legal risks, etc. Expressing these risks together in a single number is difficult.

In spite of these theoretical hurdles, MPT has already proven its value for IT management in a number of places because an objective, quantitative measure is used in the appraisal of the IT portfolio.

An example of the optimisation of an IT portfolio is shown in figure 3. This relates to the portfolio of IT products of a division of LogicaCMG³. The monthly profit is shown in euros on the vertical axis and the standard deviation of the monthly turnover on the horizontal axis. According to the portfolio calculations, it is possible that the management of this division – with constant return – can reduce the risk⁴ by almost one third (from €50,000 to €240,000). On the other hand – with constant risk – the monthly result could be increased by €500,000.⁵ The management has concrete and practical support because it can look at the composition of the optimum portfolio and can change the current portfolio in the desired direction. A minimum risk in this context means as few fluctuations in the monthly turnover as possible; a maximum return refers to the maximum average profit to be achieved per month.

These calculations also give interesting mathematical results. Figure 3 gives e.g. the max return-risk ratio.



³ LogicaCMG is a international IT-service corporation listed on the London and Amsterdam stock exchange.

⁴ Here we are using the volatility in the monthly revenues as a measure of the risk. See also the remarks previously made about other sources of risk (in the section on MPT for example).

⁵ It is here that one of the hurdles for the application of the theory immediately comes into view: the question is whether such a shift in the portfolio in the market is possible. Competitive conditions and agreements with clients can prevent the adaptability of the portfolio. At the same time it is clear that these outcomes indicate concrete directions for LogicaCMG management. After all, the calculated optimum portfolios indicate how the portfolio of IT products must then be composed. These calculations are amongst others based on restrictions that the components of the portfolio may only be changed to a limited degree.

Figure 3. Example of the application of MPT

This investment approach towards IT may be applied to many other IT issues: for example econometric models have been constructed which can be used to indicate at an early stage how great the probability of budget overruns of IT projects is, how great the probability of overrunning the project duration is, how great the probability is that the required ROI will not be realised, etc.

Insight

The two biggest problems that occur on the introduction of the portfolio approach in IT are the lack of insight into the current IT portfolio and its controllability. Inquiries to a number of responsible officers in municipalities in the Netherlands show that they do not have the faintest idea about the IT intensity (ratio of total IT costs to total operating costs) in their municipality, let alone the composition of the IT portfolio. If an Act similar to the Clinger-Cohen Act were to be adopted in the Netherlands, this would force many changes to the management of IT in public authorities, both as regards transparency and composition of the portfolio. A first step could be to gain access to the IT portfolios at ministry level.

Insight into the portfolio requires the availability of indicators for the different activities and components. They can be qualitative and quantitative indicators. Without this information a portfolio approach has no chance. A first good step is to start with ordinal variables and to give the activities such a score. In this way an ordering of parts of the portfolio can be

made. In the context of a profit centre, where the aim is to make a profit, and a service centre where the aim is to break even, we usually have more information at our disposal: a portfolio approach is more easily possible here. (See Kersten & Verhoef, 2003 for some simple examples.)

Ability to adapt

The next problem is the controllability and ability to adapt the IT portfolio. Research into a portfolio approach at some banks and at an IT company show that a portfolio approach certainly shows up the weaknesses in the IT portfolio, but that to adjust for its weaknesses is sometimes complicated and time consuming. In some cases it shows that 70 to 80% of the IT costs are fixed – or appear fixed – and that adjustment is only possible for the remaining part of the portfolio.

In addition, clearing out the portfolio is not easy. We know from the financial markets that there are two important conditions for the optimisation of portfolios: you have to be able to sell parts of the portfolio (buyers must be found and a price must be determined) and you have to be able to expand the portfolio (there must be sellers of interesting objects). In the IT world this is not a natural matter. Where, for example, it turns out that in one of the IT portfolios there are activities that are not profitable and cannot be made profitable, then the company has the choice of removing the activity from the portfolio (scrapping or selling) or accepting this loss item. But a software development line or a help desk is more difficult to sell than a share on the stock market. We also often see that selling or outsourcing is often difficult for political or strategic reasons.

Phasing

It makes a difference whether IT is seen as a loose collection of simply cost-generating hardware and software or as a coherent system of organisation, people, processes, services and resources aimed at a clear result. An overall optimal portfolio delivers the best result, but also sets requirements for assembling and managing the portfolio. A development path for organisations is outlined in figure 4.

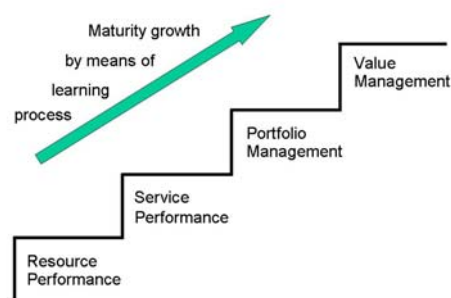


Figure 4. Development route to IT value management

As figure 4 shows, implementing the portfolio management approach goes through four phases - resource performance, service performance, portfolio management and value management.

- **Resource performance** - is the use and the development of measuring tools that enables the management to link costs and the degree of utilisation. In this way it is possible to build up hardware or software portfolios and to manage them.

- **Service Performance** - As organisations increasingly provide their IT as a service and use service level agreements, the need for a greater transparency and the use of different settlement methods increases. The offering of a system of IT components within their (organisational) context as if it were one single service, gives substance to the required transparency. At the same time this simplification causes an increase in complexity such as the necessary charging out of costs on the basis of services purchased or service transactions.
- **Portfolio Management** - The next step in the learning process consists of no longer considering IT services in isolation but rather in conjunction with each other. Certainly in large organisations there is no integral view of the coherence within IT, at most in outline. The exact detailing of the portfolio on the basis of an IT due diligence alone is expected to produce major benefits in many organisations. It improves the quality of issues such as sourcing and purchasing. Any redundancy in the IT activities can be removed. Insight into the increased complexity gives cause for unravelling, even before deciding on possible (out)sourcing.
- **Value Management** - The path outlined here leads to the most desirable situation in which optimum value determination, value delivery and value management is possible. The situation in which both the Chief Financial Officer and the Chief Information Officer work together seamlessly from the same management perspective; a perfect *fit for purpose* of both IT and business. For this a good IT portfolio is a necessary requirement.

Portfolio management versus Programme management

Since the Clinger-Cohen Act became effective in the United States, IT watchers have been expecting that the investment approach that is characteristic for the Act would get ashore in Europe. It could lead to the same business rationalisation within the government as well as within large companies. However, this has, until now, not really been the case. One of the reasons might be the lack of data, another reason might be lack of knowledge of an investment approach towards IT and finally the cause could lie in IT-governance field. We feel that it is quite necessary to provide insight into the validity and contribution of IT before others, outside the IT domain, ask for this.

In the United Kingdom, Prime Minister Tony Blair has called upon the government agencies to use programme management so that the added value of projects could be increased. The definition of programme management which is used, is: “*the co-ordinated management of a portfolio of projects that change organisations to achieve benefits that are of strategic importance*”⁶ Of course programme management and portfolio management are essentially different, although related. Portfolio management is applicable where there is a large range of stand-alone and independent projects – as there would be with an investment portfolio. Programme management is where the projects are related in that they are focused on achieving a common set of benefits. The latter is, on its turn, closely related to project management.

Active within the field of programme management in the UK is ProgM the Programme Management Special Interest Group (see also www.e-programma.com). Central to the

activities of this group are the promotion of understanding of programme management, the exchange of information and best practices, the development of methodology and techniques, the provision of standards and handbooks, and the promotion of science and discipline of programme management. Also, there is much attention on benefit management and project selection – seeking to identify best practice in “why are we doing this”. In IT portfolio management the investment approach is leading. Combining the good things of IT portfolio management and taking the lessons learnt from the Clinger Cohen Act, will boost the benefits of these programme management initiatives.

In conclusion

In the coming years portfolio management is likely to remain high on the agenda of both IT managers and business managers. This will certainly be the case in the Netherlands if the Dutch government follows in the footsteps of its American counterpart and uses legislation to impose a portfolio approach on budget holders in the Dutch government. This will contribute greatly to insight into the IT costs and revenues of the different public authorities. Terms such as ‘IT intensity’ and ‘Net Present Value of IT’ are extremely rarely used by the government at the moment.

However, large companies in the Netherlands are already persuaded of the added value of a portfolio approach. FUA, LogicaCMG and several large banks are carrying out research in this arena, in connection with the research into software asset management. Other IT companies are coming on board too. It is expected that this will lead to the development of agreed practice and usable methods for optimising IT portfolios.

⁶ CCTA, “Managing Successful Programmes”, The Stationary Office, London, 1999 and 2003

Literature

CCTA, “Managing Successful Programmes”, The Stationary Office, London, 1999 and 2003

Kersten, H.M.P & H. Verniers (2004). Investing in Service Portfolio Management: from IT costs to IT value. In: *Yearbook for IT Management, 2004* (in Dutch).

Kersten, H.M.P. & C. Verhoef (2003). IT portfolio management: a banker’s perspective on IT. In: *Cutter IT Journal, Vol. 16, no. 4*, pp 34-40. Also appeared in: *Strategies for Effective Project Portfolio Management* (Cutter Consortium).

Kersten, H.M.P. & S. Ozdemir (2004). *Optimizing an IT product portfolio*. Free University of Amsterdam, 2004, See also www.few.vu.nl/~hkersten.

Kersten, H.M.P., & J. Evans (2003). Priorities in IT Due Diligence. In: *New Banking Frontiers*, pp. 32-33, 2003.

Markowitz, H. (1952). Portfolio Selection. In: *Journal of Finance*.

Verhoef, C. (2002). Quantitative IT Portfolio Management. In: *Science of Computer Programming, Vol. 45 (October)*, pp. 1-96.

Bert Kersten

is consulting director at LogicaCMG Financial Services and Professor of Business Mathematics at the Free University of Amsterdam.

Han Verniers

is principal consultant at LogicaCMG Financial Services.